

ABSTRACT

An insulated organic copolymer is provided, having the excellent mechanical strength and deposition property at an interface contacting the lower base or the upper layer of the inorganic insulation film, and the effective dielectric constant is low as the whole film, which is suitable as the interlayer insulation film that separates the multi-layer copper wirings of the semiconductor device. The organosiloxane copolymer film is obtained by the polymerization of the cyclosiloxane and the straight-chain siloxane as the raw materials by the plasma excitation of both. At the interfaces contacting the inorganic insulation films, the interface layers having a film quality that is intricate and excellent in deposition property are prepared whereby the main component of the film composition is the straight-chain siloxane. The inner section of the copolymer film mixes the cyclosiloxane component having pores surrounded by the cyclosiloxane backbone and the straight-chain siloxane components, has the network structure layer relatively suppressing the density, and has the composition changing in the thickness direction whereby the multi-layer wirings embedding the copper thin film is formed.

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